

CLAIMS

What is claimed is:

- 5 1. A method for restoring a diversely routed circuit in a mesh network, comprising the steps of:
 - receiving one or more triggers at one of a destination node and a source node of a first path, said one or more triggers indicating a path failure;
 - switching from said first path to a functional second path, prompted at least
 - 10 partially by said one or more triggers, to restore said circuit; and
 - restoring said first path to a functional path.
- 15 2. The method according to claim 1, further comprising the step of detecting a path failure condition in said first path, prior to said receiving step.
3. The method according to claim 2, further comprising the step of initiating and sending one or more triggers in a first direction along said first path for signaling said path failure condition.
- 20 4. The method according to claim 1, further comprising the step of initiating and sending one or more triggers in a first direction along said first path for signaling said path failure condition, said initiating and sending step occurring prior to said receiving step.
- 25 5. The method according to claim 4, further comprising the step of initiating one or more triggers in a second direction along said first path, substantially contemporaneous with said one or more triggers sent in said first direction along said first path.

6. The method according to claim 5, further comprising the step of receiving said one or more triggers in said second direction of said first path at the other of said destination node and said source node.

5 7. The method according to claim 1, further comprising the step of initiating and sending one or more triggers in at least one of a first direction along said first path, a second direction along said first path, a first direction along said second path, and a second direction along said second path.

10 8. The method according to claim 7, wherein said step of initializing and sending comprises the step of initiating and sending one or more LDP messages for signaling said path failure condition.

9. The method according to claim 7, wherein said step of initializing and sending
15 comprises the step of initiating and sending one or more path AIS messages for signaling said path failure condition.

10. The method according to claim 7, wherein said step of initializing and sending
20 comprises the step of initiating and sending one or more path Unequipped messages for signaling said path failure condition.

11. The method according to claim 7, wherein said step of initializing and sending
25 comprises the step of initiating and sending one or more path unequipped messages for signaling said path failure condition.

12. The method according to claim 7, further comprising the step of determining
30 whether a switch has occurred at one of said source and destination nodes, and calculating according to a predetermined algorithm whether to switch one of said source and destination nodes to a second path.

13. The method according to claim 12, further comprising the step of when said algorithm calculates that a switch is required and that said switch has not already occurred, switching one of said source and destination nodes from said first path to a functional second path.

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14. The method according to claim 1, wherein said step of restoring comprises repairing said path failure of said first path.

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15. The method according to claim 1, wherein said step of restoring comprises calculating and implementing a new path between said source node and said destination node.

16. A method for restoring a diversely routed circuit in a mesh network, comprising the steps of:

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receiving a path trigger at a destination node and a source node of a first path indicating a bi-directional failure in a diversely routed dual-cast circuit;

switching from said first path to a functional second path, prompted at least partially by said trigger, to restore said circuit; and

restoring said first path.

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17. The method according to claim 16, further comprising the step of detecting a path failure condition in said first path, prior to said receiving step.

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18. The method according to claim 17, further comprising the step of initiating and sending one or more triggers in a first direction and a second direction along said first path for signaling said path failure condition, prior to said receiving step.

19. The method according to claim 18, further comprising the step of determining whether a switch has occurred at one of said source and destination nodes, and

calculating according to a predetermined algorithm whether to switch one of said source and destination nodes to a second path.

20. The method according to claim 19, further comprising the step of when said
5 algorithm calculates that a switch is required and that said switch has not already occurred, switching one of said source and destination nodes from said first path to a functional second path.

21. The method according to claim 16, wherein said step of restoring comprises
10 repairing said bi-directional failure of said first path.

22. The method according to claim 16, wherein said step of restoring comprises
calculating and implementing a new path between said source node and said destination
15 node.

23. A method for restoring a diversely routed circuit in a mesh network, comprising the
steps of:

- receiving a trigger at one of a destination node and a source node of a first path
indicating a uni-directional failure in a diversely routed dual-cast circuit;
20 switching one of said destination node and said source node from said first path
to a functional second path, prompted at least partially by said trigger, to restore said
circuit; and
restoring said first path.

24. The method according to claim 23, further comprising the step of detecting a path
25 failure condition in said first path, prior to said receiving step.

25. The method according to claim 24, further comprising the step of initiating and
sending one or more triggers in a first direction along said first path for signaling said
30 path failure condition, prior to said receiving step.

26. The method according to claim 23, further comprising the step of determining whether a switch has occurred at one of said source and destination nodes, and calculating according to a predetermined algorithm whether to switch one of said source and destination nodes to a second path.

27. The method according to claim 26, further comprising the step of when said algorithm calculates that a switch is required and that said switch has not already occurred, switching one of said source and destination nodes from said first path to a functional second path.

28. The method according to claim 23, wherein said step of restoring comprises repairing said uni-directional failure of said first path.

29. The method according to claim 23, wherein said step of restoring comprises calculating and implementing a new path between said source node and said destination node.

30. A method for restoring a diversely routed circuit in a mesh network, comprising the steps of:

receiving one or more triggers at a destination node and a source node of a first path indicating a bi-directional failure in a diversely routed uni-cast circuit;

switching from said first path to a functional second path, prompted at least partially by said one or more triggers, to restore said circuit; and

restoring said first path.

31. The method according to claim 30, further comprising the step of detecting a path failure condition in said first path, prior to said receiving step.

32. The method according to claim 31, further comprising the step of initiating and sending one or more triggers in a first direction and a second direction along said first path for signaling said path failure condition, prior to said receiving step.

5 33. The method according to claim 30, further comprising the step of determining whether a switch has occurred at one of said source and destination nodes, and calculating according to a predetermined algorithm whether to switch one of said source and destination nodes to a second path.

10 34. The method according to claim 33, further comprising the step of when said algorithm calculates that a switch is required and that said switch has not already occurred, switching one of said source and destination nodes from said first path to a functional second path.

15 35. The method according to claim 30, wherein said step of restoring comprises repairing said bi-directional failure of said first path.

20 36. The method according to claim 30, wherein said step of restoring comprises calculating and implementing a new path between said source node and said destination node.

37. A method for restoring a diversely routed circuit in a mesh network, comprising the steps of:

receiving one or more triggers at one of a destination node and a source node of a
25 first path indicating a uni-directional failure in a diversely routed uni-cast circuit;
switching one of said destination node and said source node from said first path to a functional second path, prompted at least partially by said one or more trigger; and
restoring said first path.

38. The method according to claim 37, further comprising the step of detecting a path failure condition in said first path, prior to said receiving step.

39. The method according to claim 38, further comprising the step of initiating and
5 sending one or more triggers in a first direction along said first path for signaling said path failure condition, prior to said receiving step.

40. The method according to claim 39, further comprising the step of switching the
other of said destination node and said source node from said first path to said functional
10 second path to restore said circuit.

41. The method according to claim 40, further comprising the step of determining
whether a switch has occurred at one of said source and destination nodes, and
calculating according to a predetermined algorithm whether to switch one of said source
15 and destination nodes to a second path.

42. The method according to claim 41, further comprising the step of when said
algorithm calculates that a switch is required and that said switch has not already
occurred, switching one of said source and destination nodes from said first path to a
20 functional second path.

43. The method according to claim 39, wherein said step of restoring comprises
repairing said uni-directional failure of said first path.

25 44. The method according to claim 39, wherein said step of restoring comprises
calculating and implementing a new path between said source node and said destination
node.

45. A method for restoring a diversely routed circuit in a mesh network, wherein traffic propagates along a working path in at least one direction, said method comprising the steps of:

recognizing an indication of a path failure; and

- 5 switching from said working path to a reserved protect path to restore said circuit in a manner such that said traffic propagates in said at least one direction.

46. The method of claim 45, wherein said recognizing step comprises sending one or more triggers in a downstream direction and an upstream direction of said working path.

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47. The method of claim 45, wherein said recognizing step comprises receiving said one or more triggers at a destination node and a source node of said working path, said one or more triggers indicating said path failure.

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48. The method of claim 45, further comprising the step of sending one or more triggers in an upstream direction of said protect path.

49. The method of claim 45, further comprising the step of restoring said failure of said working path.

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50. The method according to claim 49, wherein said step of restoring comprises repairing said path failure of said working path.

51. The method according to claim 49, wherein said step of restoring comprises

- 25 calculating and implementing a new path between a source node and a destination node.